PIONEER 200 Aircraft FLIGHT MANUAL

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Cover page

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AIRCRAFT TYPE & MODEL	
Type :	Pioneer
Model :	200
Aircraft Mark :	
Aircraft S/N :	

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AMENDMENT RECORD SHEET

Revision No.	Page(s) affected	Signature.	Date of Incorporation
0	All pages		20-03-02

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INTRODUCTION

This Flight Manual applies only to the particular aircraft identified by the registration marking and serial number on the Cover Page and contains the airworthiness limitations and essential operating data for this aircraft.

The Flight Manual shall be carried in the aircraft on all flights.

Special operations requiring additional limitations and instructions are listed in the "Supplements Section" and this section shall be consulted before undertaking any such operations. For operating information not included in this manual, reference should be made to the appropriate operations or manufacturer's manuals.

The pilot in command the aircraft shall comply with all requirements, procedures and limitations with respect to the operation of the aircraft set out in the Flight Manual for the aircraft.

Amendments shall be issued by Alpi Aviation as necessary and will take the form of replacement pages, with the changes to the text indicated by a vertical line in the margin together with the amendment date at the bottom of the page.

Interim/Temporary amendments may be issued in the same manner and are to be inserted as directed. These amendments will be issued on coloured pages and will take precedence over the stated affected page. It is the owner's responsibility to incorporate in this manual all such amendments, and to enter the date of incorporation and his signature on the appropriate Amendment Record Sheet.

No entries or endorsements may be made to this Flight Manual except in the manner and by persons authorised for the purpose.

REVISIONS

It is the responsibility of the owner to maintain this Manual in a current status when it is being used for operational purposes.

Owners should contact Alpi Aviation S.r.l. whenever the revision status of their Manual is in question.

A revision bar will extend the full length of new or revised text and/or illustrations added on new or presently existing pages. This bar will be located adjacent to the applicable revised area on the outer margin of the page.

All revised pages will carry the revision number and the date on the applicable page.

The following List of Effective Pages provides the dates of issue for original and revised pages, and a listing of all pages in the Manual. Pages affected by the current revision are indicated by an asterisk (*) preceding the pages listed.

LIST OF EFFECTIVE PAGES

The dates of issue for original & revised pages are:

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DEFINITIONS

AIRFIELD PRESSURE ALTITUDE	The Airfield Pressure Altitude is that altitude registered at the surface of the aerodrome by an altimeter with the pressure subscale set to 1013 millibars
INDICATED AIRSPEED (I.A.S.)	Indicated airspeed, which is the reading obtained from an airspeed indicator having no calibration error.
TAKEOFF SAFETY SPEED	The Takeoff Safety Speed is a speed chosen to ensure that adequate control will exist under all conditions, including turbulence and sudden and complete engine failure, during the climb after takeoff.
LANDING SAFETY SPEED	The Landing Safety Speed is the speed chosen to ensure that adequate control will exist under all conditions, including turbulence, to carry out normal flare and touchdown.
NORMAL OPERATING SPEED	This speed shall not normally be exceeded. Operations above the Normal Operating Speed shall be conducted with caution and only in smooth air.
Va MANOEUVRING SPEED	Maximum for manoeuvres involving an approach to stall conditions or full application of the primary flight controls.
KCAS KNOTS CALIBRATED AIRSPEED	Indicated airspeed corrected for position and instrument error and expressed in knots. KCAS is equal to KTAS in standard atmosphere at sea level
KIAS KNOTS INDICATED AIRSPEED	The speed shown on the airspeed indicator and expressed in knots.
KTAS KNOTS TRUE AIRSPEED	The airspeed expressed in knots relative to undisturbed air which is KCAS corrected for altitude and temperature.
V fe MAXIMUM FLAP EXTENDED SPEED	The highest speed permissible with wing flaps in the prescribed extended position.
V no MAXIMUM STRUCTURAL CRUISING SPEED	The speed that should not be exceeded except in smooth air, and then only with caution.
V ne NEVER EXCEED SPEED	The speed limit that may not be exceeded at any time.
V s0 STALLING SPEED	The stall speed or minimum steady flight speed at which the airplane is controllable in a specified configuration.
V so STALLING SPEED LANDING CONFIGURATION	The stall speed or minimum steady flight speed at which the airplane is controllable in the landing configuration at the most forward centre of gravity.

V x BEST ANGLE-OF-CLIMB SPEED	The speed which results in the greatest gain of altitude in a given horizontal distance.
V y BEST RATE-OF-CLIMB SPEED	The speed which results in the greatest gain in altitude in a given time.

METEOROLOGICAL TERMINOLOGY

OAT OUTSIDE AIR TEMPERATURE	The free static air temperature. It is expressed in either degrees Celsius or degrees Fahrenheit.
STANDARD TEMPERATURE	Standard Temperature is 15 degrees C at sea level pressure altitude.
PRESSURE ALTITUDE	The altitude read from the an altimeter when the altimeter's barometric scale has been set to 1013 mb (29.92 inches of mercury).

ENGINE POWER TERMINOLOGY

BHP BRAKE HORSEPOWER	The power developed by the engine.
RPM REVOLUTIONS PER MINUTE	Engine speed.
STATIC RPM	The engine speed attained during a full-throttle engine runup when the airplane is on the ground and stationary.

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

MAXIMUM CROSSWIND VELOCITY	The velocity of the crosswind component for which adequate control of the airplane during takeoff and landing was actually demonstrated during the certification tests. The value shown is limiting.
USEABLE FUEL	The fuel available for flight planning
UNUSABLE FUEL	The quantity of fuel that cannot be safely used in flight
LPH LITRES PER HOUR	The amount of fuel (in litres) consumed per hour
NMPL NAUTICAL MILES PER LITRE	The distance (in nautical miles) which can be expected per litre of fuel consumed at a specific engine power setting and/or flight configuration.
g	The acceleration due to gravity.

WEIGHT AND BALANCE TERMINOLOGY

STATION	Only two load stations are specified: ie Seat Station which is the centre of the fixed seats and Fuel Station which is the centre of the fixed fuel tank.
C.G. CENTRE OF GRAVITY	The point at which an airplane, or equipment, would balance if suspended.
C.G. LIMITS	The extreme centre of gravity locations within which the airplane must be operated at a given weight.
STANDARD EMPTY WEIGHT	The weight of a standard airplane, including unusable fuel, full operating fluids and full engine oil.
BASIC EMPTY WEIGHT	The standard empty weight plus the weight of optional equipment.
USEFUL LOAD -	The difference between ramp weight and the basic empty weight.
MTOW MAXIMUM TAKEOFF WEIGHT	The maximum weight approved for the start of the takeoff run.

Section1 - General

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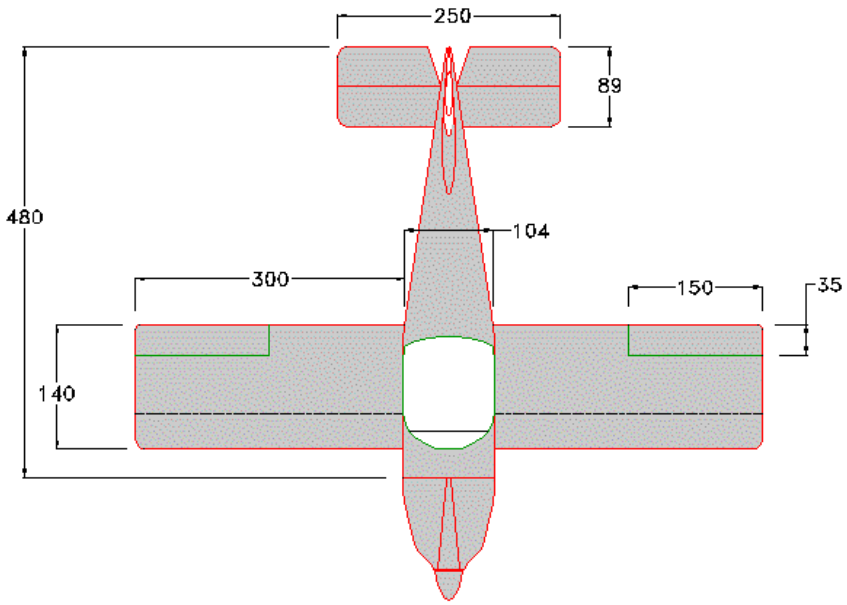
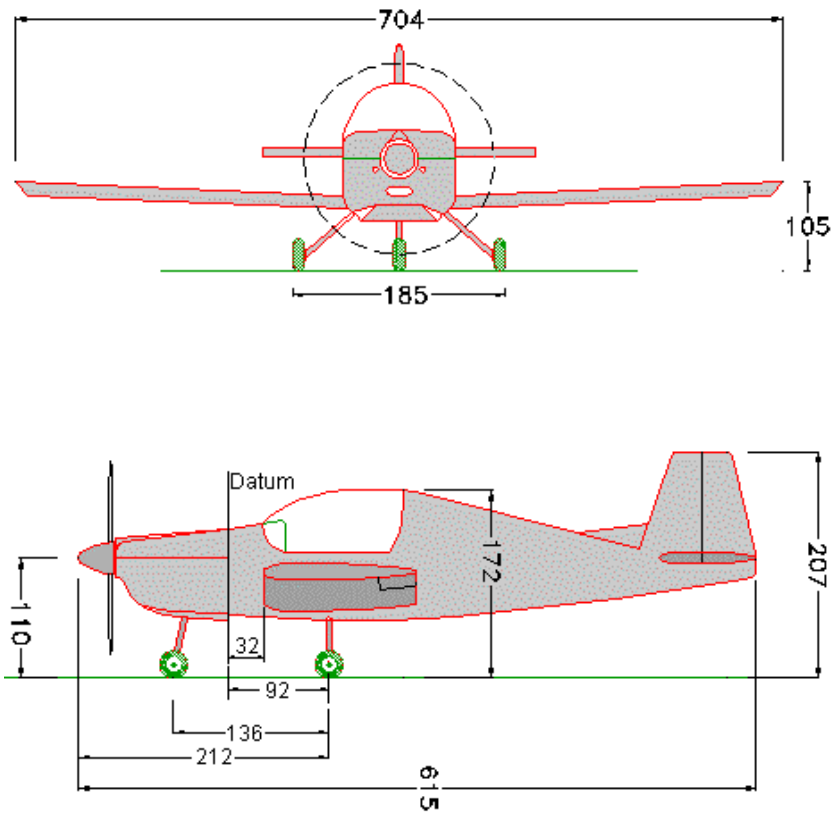
1.1. AIRCRAFT THREE VIEW DRAWING





Ground Turning Radius = 6 metres.

1.2. TECHNICAL DATA

1.2.1. ENGINE

Manufacturer:	ROTAX GmbH
	Aircraft Engine
Type:	912 UL Series liquid cooled

1.2.2. PROPELLER

Manufacturer:	TONINI
Type:	Fixed Pitch Wooden **GT 166X142**
Diameter:	166 cm
Pitch:	142 cm

1.2.3. APPROVED FUEL TYPES AND GRADES

-UNLEADED MOGAS (98 Octane or greater - 90 RON or greater) -100 LL or 100/130 grade aviation gasoline (only for short utilization time, with carbon level inspection)

1.2.4. FUEL CAPACITY

Total:	54 Litres
Useable	50 Litres

1.2.5. APPROVED OIL GRADES

Motorcycle oil of a registered brand with gear additive	
Specification	API classification "SJ" or "SG"
Exemples :	Shell - Advance VSX 4 (SAE 20W-40)
	Castrol - Syntetic Blend (SAE 5W-50)
	Shell - Synthetic Blend (SAE 10W-30)
For temp. Above and belove stated check Rotax engine manuals For AVGAS use chech Rotax engine manuals	

1.2.6. COOLANT

Antifreeze concentrate with additives against corrosion should be used with 50% water in normal condition, and down 20% water in cold environment.

Capacity	Max 2,3 litres	Min 2,2 litres
Overflow or filler tank	Max 0,2 lt	Min 0,1 lt

1.2.7. OIL CAPACITY

Sump capacity is : 3 Litres

1.2.8. TYRE INFLATION PRESSURES

Standard Mains:	bar = 2.2 (psi = 32.3)
Nose:	bar = 2.2 (psi = 32.3)

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Section 2 - Limitations

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2.1. INTRODUCTI0N

Section 2 includes operating limitations, instrument markings and basic placards necessary for the safe operation of the airplane, its engine, standard systems and standard equipment. Observance of these operating limitations is required.

The aeroplane shall be operated so that the limitations and instructions included in this section are observed.

2.2. TYPE OF OPERATION

VFR by Day
see also para 2.7.1. Authorised mamoeuvres and limitations.

2.3. AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown below.

SPEED	Km/h	REMARKS
V ne Never exceed speed	240	Do not exceed this speed in any operation.
V no Maximum structural cruising speed	215	Do not exceed this speed except in smooth air, and then only with caution.
V a Manoeuvring speed	180	Do not make full or abrupt control movements above this speed.
V fe Maximum flap extended speed	100	Do not exceed this speed with flaps down.
Vso Stall speed	63	Whit extended flaps

Airspeed Indicator Markings and their operational significance are shown below.

MARKING	Km/h Range	SIGNIFICANCE
White Arc	65 - 100	Full-flap operating range. Lower limit is max. weight Vso in landing configuration. Upper limit is max. speed permissible with flaps extended.
Green Arc	100 - 180	Normal operating range. Lower limit is Take-off Safety speed. Upper limit is max. structural cruising speed.
Yellow Arc	180 - 215	Operations must be conducted with caution and only in still air.
Red Line	240	Vne

2.4. WEIGHTS and LOADING

Maximum takeoff weight	**450 Kg**
Maximum landing weight	**450 Kg**

2.5. CENTRE OF GRAVITY LIMITS

Forward **:**	600 mm aft of datum up to & including 350 Kg 685 mm aft of datum @ 450 Kg. *Variation is linear between 350 & 450 kg*.
Aft :	768 mm aft of datum at all weights
Datum **:**	Fire-guard bulcked

Leveling Means:

Longitudinal	Spirit Level placed lateral canopy strut
Lateral	Spirit Level crossing canopy

2.6. POWERPLANT LIMITATIONS

Instrument	Yellow Arc	Green Arc	Red Radial Line/Arc
Tachometer	1000 - 1400RPM	1400 - 5500 RPM	5800 RPM
Oil Temp.	50° - 90° C (120° - 190° F)	90° - 110°C (190° - 230° F)	140° C (285° F)
Oil Pressure	0,8 - 2,0 bar (12 - 29 psi)	2,0 - 5,0 bar (29 - 73 psi)	7 bar (102 psi)
Cylinder Head Temperature		90° - 150° C (190° - 300° F)	150° C (300° F)

Minimum Oil Temperature for Takeoff	Needle must be seen to move off the stop before Takeoff	
Minimum Oil Pressure	in Level Flight or climb	2 bar (29 psi)
	In Descent	0,8 bar (12 psi)
Maximum Cylinder Head Temperature		150° C (300° F)
Maximum RPM for all operations		5800
Full Throttle Static RPM	Not Above	5500
	Not Under	5300

2.7. OTHER LIMITATIONS

2.7.1. AUTHORISED MANOEUVRES AND ASSOCIATED LIMITATIONS

Acrobatic maneuver, including spins, are **not** permitted.

2.7.2. SMOKING

Prohibited.

2.7.3. MAXIMUM AIR TEMPERATURE FOR OPERATIONS

40^{O} C for takeoff at gross weight.

2.7.4. MAXIMUM PERMISSIBLE NUMBER OF OCCUPANTS

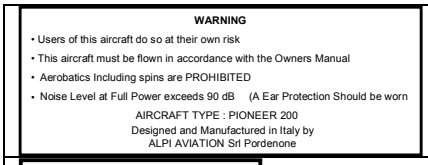
Two (including Pilot).

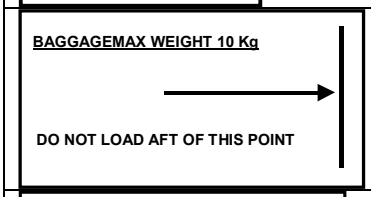
2.8 MAXIMUM CROSSWIND VELOCITY

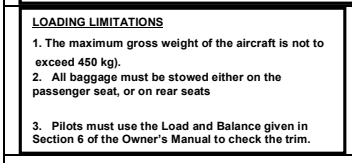
25 Km/h

2.9. PLACARDS

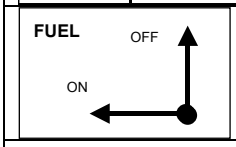
Cockpit Placards General







Cockpit Controls



External Fuselage

STATIC VENT KEEP CLEAR		
EARTH ON		
No step		
Tyre pressure 32.3 Psi (2.2 Bar)		
FUEL AVGAS 100LL (See Sect 1) or UNLEADED MOGAS 98 Octane or Higher 54 Lt capacity Earth on Post		

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Section 3 - Emergency Procedures

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3.1. INTRODUCTION

Section 3 provides checklist and other procedures for coping with emergencies that may occur. Emergencies caused by aeroplane malfunctions are rare if proper preflight inspections and maintenance are practiced. En route weather emergencies can be minimized or eliminated by careful flight planning and good judgement when unexpected weather is encountered. However, should an emergency arise, the basic guidelines outlined in this section should be considered and applied as necessary to correct the problem.

3.2. AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure After Takeoff	90-100 Km/h
Manoeuvring Speed (at all weights)	180 Km/h
Maximum Glide Distance, Still Air	110 Km/h [1]
Precautionary Landing Approach with Engine Power	100 Km/h
Landing Approach Without Engine Power:	
landing Flaps Up	150 Km/h
landing Flaps Down	90 Km/h

Note[1] : A slightly higher speed may give better distance over the ground if gliding into wind; a slightly lower speed if gliding downwind.

3.3. OPERATIONAL CHECKLISTS

3.3.1. ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF RUN

1	Throttle	Idle
2	Brakes	Apply
3	Ignition Switches	OFF
4	Master Switch	OFF

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1	Move the control stick FORWARD to mantain Airspeed :	90-100 Km/h
2	Fuel Shutoff Valve	OFF
3	Ignition Switches	OFF
4	Wing Flaps	as required
5	Master Switch	OFF

ENGINE FAILURE DURING FLIGHT

1	Airspeed	Best Glide Angle 110 Km/h (1)
2	If it is Carburetor Heat	ON
3	Fuel Shutoff Valve	ON
4	Fuel Pump	ON
5	Ignition Switches	ON

Note[1] : A slightly higher speed may give better distance over the ground if gliding into wind; a slightly lower speed if gliding downwind

AIRSTART & LIMITATIONS

In the event that the engine is stopped during flight, it may be restarted by application of fuel & ignition, provided that the propeller is still windmilling.

The following procedure addresses only airstarts by use of the Starter Motor.

IMPORTANT
***DO NOT* depress starter button while propeller is rotating.**

1	Ignition Switches	OFF
2	Cabin	Clear
3	Increase angle of attack & reduce speed (up to & including a stall) until propeller stops rotation	
4	Establish Glide	110 Km/h
5	Fuel	ON
6	Fuel Pump	ON
7	Master	ON
8	Ignition Switches	ON
9	Starter Button	Depress
10	Throttle	Open
11	Repeat as necessary: **Ensuring propeller has stopped rotation before each restart attempt.**	

Note : The engine cools quickly with the propeller stopped. Choke may need to be used to start if time between restart is longer. After restart not RPM max power.

3.3.2. FIRE

FIRE DURING START ON GROUND

1	Cranking	CONTINUE to get a start that would suck the flames and accumulated fuel through the carburettor and into the engine.	
If engine starts,			
2	Power	2500 RPM	
3	Fuel	OFF & allow engine to empty carburettor	
4	Engine	Inspect for damage	
If engine fails to start,			
5	Cranking	CONTINUE in an effort to obtain a start. If no start in 15 seconds : Shut off fuel & continue to crank for another 15 seconds.	
6	Fire Extinguisher	Obtain **(have ground attendant sobtain if not installed).**	
7	Engine	SECURE.	
		A Master Switch	OFF
		B Ignition Switch	OFF
		C Fuel Pump Switch	OFF
		D Fuel Shutoff Valve	OFF
8	Fire	Extinguish using fire extinguisher, wool blanket, or dirt.	
9	Fire Damage	Have authorised people inspect, repair damage or replace damaged components or wiring before conducting another flight.	

ENGINE FIRE IN FLIGHT

1	Throttle	CLOSED
2	Fuel Shutoff Valve	OFF
3	Mag Switches	OFF
4	Master Switch	OFF
5	Fuel Pump Switch	OFF
6	Cabin Air	OFF
7	Airspeed	110 Km/h (if fire is not extinguished, increase glide speed to find an airspeed which will provide an incombustible mixture).
8	Forced Landing	Execute (as described in Emergency Landing Without Engine Power).

ELECTRICAL FIRE IN FLIGHT

1	Master Switch	OFF
2	All Other Switches	OFF
3	Vents/cabin air (*)	OPEN
If fire appears out and electrical power is necessary for continuance of flight:		
4	Master Switch	ON
5	Fuses	CHECK for faulty circuit, **DO NOT** reset or replace.
6	Radio/Electrical Switches	ON one at a time, with delay after each until short circuit is localised.
7	Land as soon as possible to inspect for damage	

CABIN FIRE

1	Master Switch	OFF
2	Vents/Cabin Air (*)	OPEN
3	Land as soon as possible to inspect for damage.	

(*) Have been demonstrated possibility to open canopy in flight up to 100 mm slot, manually blocked in this position. If released, the canopy will close by aerodynamic force.

3.3.3. FORCED LANDINGS

AIRFIELD OR AIRSTRIP EMERGENCY LANDING WITHOUT ENGINE POWER

1	Airspeed	100-105 Km/h (flaps UP) Approach 90 Km/h (flaps DOWN)
2	Fuel Shutoff Valve	OFF
3	Fuel Pump	OFF
4	Ignition Switches	OFF
5	Wing Flaps	as required
6	Master Switch	OFF
	Note : IF FIRE	Release canopy and seat belts just before touchdown. Cushion face at touchdown with folded coat or cushion
7	Touchdown	Slightly Tail Low
8	Brakes	as required

AIRFIELD OR AIRSTRIP PRECAUTIONARY LANDING WITH ENGINE POWER

1	Airspeed	100-105 Km/h
2	Wing Flaps	1st Stage
3	Fuel Pump	ON
4	Selected Field	FLY OVER Note terrain and obstructions
5	Radio and Electrical Switches	ON
6	Wing Flaps	FULL (on final approach)
7	Airspeed	90 Km/h
	Note : IF FIRE	Release canopy and seat belts just before touchdown. Cushion face at touchdown with folded coat or cushion
8	Touchdown	Slightly Tail Low
9	Ignition Switch	OFF
10	Brakes	as required

OPEN FIELD FORCED LANDING WITHOUT ENGINE POWER

1	Airspeed	105-110 Km/h
2	Flap and gears	UP
3	Fuel Shutoff Valve	OFF
4	Fuel Pump	OFF
5	Ignition Switches	OFF
6	Master Switch	OFF

	Note : IF FIRE	Release canopy and seat belts just before touchdown. Cushion face at touchdown with folded coat or cushion
7	Touchdown	level attitude

OPEN FIELD FORCED LANDING WITH ENGINE POWER

1	Airspeed	100-110 Km/h
2	Wing Flaps	1st Stage
3	Fuel Pump	ON
4	Selected Field	FLY OVER Note terrain and obstructions
5	Radio and Electrical Switches	ON
6	Flaps	UP (on final approach)
7	Airspeed	110 Km/h
8	If time allows put propeller in orizontal position with Ignition Switch	OFF
	Note : IF FIRE	Release canopy and seat belts just before touchdown. Cushion face at touchdown with folded coat or cushion
9	Touchdown	level attitude

DITCHING (FORCED WATER LANDING)

1	Radio	Transmit MAYDAY on area frequency, giving location and intentions.

2	Heavy Objects	SECURE
3	Approach	High winds, heavy seas INTO wind. Light winds, heavy swells Parallel to Swells
4	Wing Flaps	UP
5	Power	establish 15 m/min (50ft/min) descent at 90 Km/h
6	Canopy	Just before splashdown open canopy
7	Touchdown	level attitude
8	Face	Cushion at touchdown with folded coat or cushion
9	Aeroplane	Release seat belts. Evacuate through canopy.
10	Lifevests	Inflate

3.3.4. LANDING WITH A FLAT MAIN TYRE

1	Wing Flaps	FULL
2	Approach	Normal
3	Touchdown	GOOD TYRE FIRST hold aeroplane off flat tyre as long as possible with aileron control.

3.3.5. ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

Refit magneto-thermal fuse, if again fails continue to next airport and inspect or replace. Run, after, the engine; if the fuse again fails rectify before continuing flight.

3.3.6. MAXIMUM GLIDE

- For Minimum Rate of Sink: 110 KM/H
- For Maximum Distance in Still Air: 110 Km/h
- To maximize distance achieved into wind, increase glide speed by approximately 1/3 of wind velocity.
- Glide performance will be improved (if time permits) by stopping propeller windmilling

3.3.7. RECOVERY FROM AN INADVERTENT SPIN

While inadvertent spins are unlikely, should this occur, proceed as follows:

1	Throttle	IDLE
2	Ailerons	NEUTRALISE
3	Rudder	Opposite direction of spin and HOLD ON
4	Just AFTER rudder reaches the stop, move the control stick FORWARD far enough to break the stall. Full down elevator may be required at aft centre of gravity loadings to assure optimum recoveries.	
5	HOLD these control inputs until rotation stops. Premature relaxation of control inputs may extend the recovery.	
6	As rotation stops, neutralise rudder and make a smooth recovery from the resulting dive	

3.4. OTHER PROCEDURES

3.4.1. CARBURETTOR HEAT (IF APPLICABLE)

This system serves to prevent the formation of ice within the carburettor, where it primarily forms on the throttle plates in such a manner as to obstruct the airflow, with resultant eventual engine stoppage. Vaporisation of the fuel & expansion of air through the carburettor cause a cooling of the mixture, which can be as much as 15 degrees C below the temperature of the ambient air. This permits moisture in the air to condense and form ice. The first indications of icing are an RPM drop or a drop in manifold pressure. Progressive icing will cause obstruction of the carburettor, which manifests itself in the form of a rough running engine. During this time the smaller volume of air aspirated has richened the mixture. Ice can form more rapidly with partial throttle, due to the lower pressure in the carburettor. At full throttle, the danger is lessened somewhat. Therefore, carburettor heat is not to be used during takeoff or climb, also because it creates a small power loss.

IMPORTANT
During descent & approach, the carburettor heat should be used because low power settings create low pressures in the induction manifold. In case of a go-around, turn the carburettor heat OFF. Prolonged use of carburettor heat with more than 80% power applied could provoke detonation.

When using Carburettor Heat, pull knob to FULL ON.
DO NOT use partial Carburettor Heat.

Carburetor icing can occur when on the ground, particularly when the aircraft and engine have become damp overnight. Check carburetor heat during power check as normal, prior to lining up on runway close the throttle completely, if a low tick over or engine stoppage occurs ice is present so burn it off with twenty seconds of heat and then test again prior to take off.

3.4.2. IGNITION MALFUNCTION

A sudden engine roughness or misfiring is usually evidence of ignition problems. Switching from both ON to alternately switching each system OFF will identify which system is malfunctioning. Switch to the good system and proceed to the nearest airport for repairs.

3.4.3. LOW OIL PRESSURE

1	**A rapid drop from normal indicated pressure to indication "0"**	
	Action	Observe for smell of oil
		Open cabin air vents
		Observe for signs of spilt oil on cowls, windscreen, wing surface.
		If strong smell of oil and oil appearing on airframe, reduce power to minimum to sustain level flight and proceed to nearest landing area.
		Be prepared to make an emergency landing enroute, should the engine fail.
2	**Gradual reduction in oil pressure below observed normal position:**	
	Action:	Observe oil temperature indications
		If oil temperature is higher than normal indications and all other engine functions are normal, proceed to the nearest landing area, land and check oil levels and external oil system for leaks
		If oil level is low, top-up to full mark on dipstick
		Allow engine to cool, start engine, run to full power and recheck oil pressure
		If oil pressure readings are normal, proceed with flight, observing both oil pressure and temperature readings.
		If, after the run-up check, the oil pressure remains low, have the engine checked by an authorised person.

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Section 4 - Normal Operations

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4.1. INTRODUCTION

Section 4 provides checklist and other procedures for the conduct of normal operations.

4.2. SPEEDS FOR NORMAL OPERATION

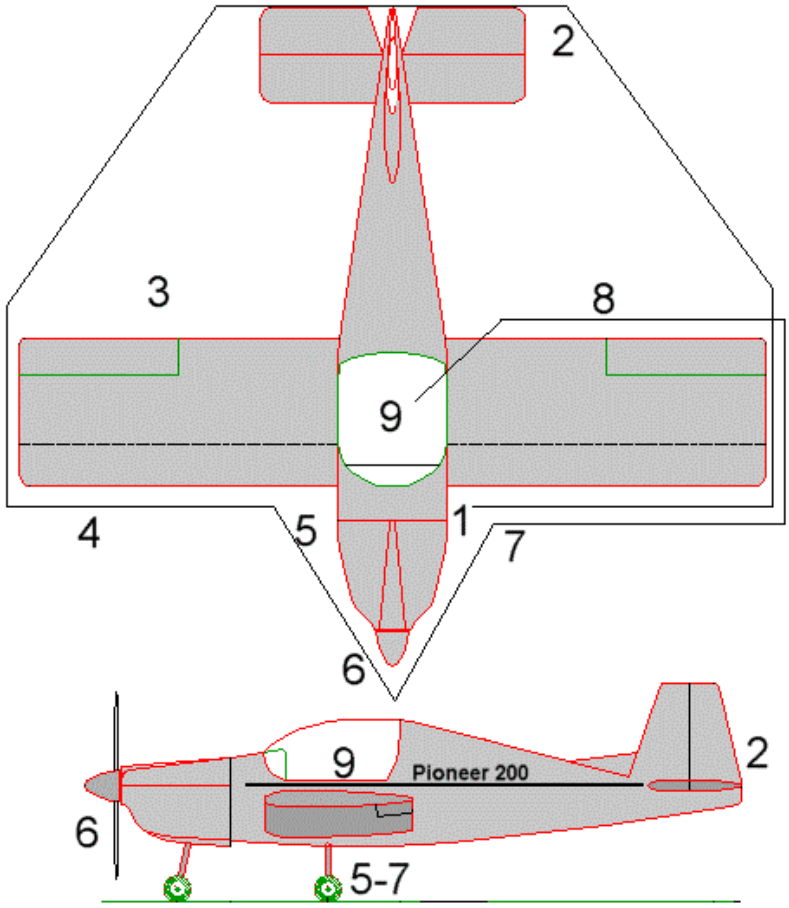
The following speeds are based on a maximum weight of 450 Kg and may be used for any lesser weight.

Takeoff:		**Km/h**
	Initial Climb Out, 1st Stage Flap	100
	Short Field Takeoff, 1st Stage Flap Speed at 15 meters..	90
	When Clear obstacles retract flaps and climb at	110
Climb, Flaps Up:		**Km/h**
	Normal	110
	Best Rate of Climb, at low altitude	110
	Note: Best Obstacle clearance gradient is with 1st Stage Flaps at 110 Km/h; but do not maintain this condition for longer than necessary as this may cause excessive engine temperatures	
Landing Approach:		**Km/h**
	Normal Approach, Flaps Full	100
	Short Field Approach, Flaps Full.	90
Baulked Landing:		**Km/h**
	Apply full power; allow speed to increase to	100
	Retract Flap to 1st Stage until clear of obstacles Then retract flap fully and continue to climb at or above	110
	Maximum Recommended Turbulent Air Penetration Speed	180
	Maximum Demonstrated Crosswind Velocity	25

4.3. CHECKLIST & PROCEDURES

4.3.1. PREFLIGHT INSPECTION

Prior to flight, the aircraft should be inspected in accordance with the following checklists and in the sequence shown in the following diagram:



NOTE
Visually check airplane for general condition during walk-around inspection. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. Also, make sure that control rods and cables are free of ice and move freely.

PREFLIGHT INSPECTION CHECKLISTS

1 - FUEL		
1	Fuel Quantity	CHECK level in tank through **visual** or little rod. Chech instrument for security
2	Water Check	Before first flight of the day & after each refueling, use sampler cup & drain small quantity of fuel from fuel tank sump quick-drain valve & check for water & sediment.
3	Fuel Filler Cap	CHECK secure

2 - EMPENNAGE		
1	Tail Tie-down	DISCONNECT
2	Control Surfaces	CHECK freedom of movement & security
3	Rudder, Elevator & Trim	CHECK freedom of movement & security
3 - RIGHT WING - TRAILING EDGE		
1	Aileron	CHECK freedom of movement & security.
2	Flap	CHECK security
3	Control Rods & Cables	CHECK aileron & flap control bolts & nuts & flap control rod for security. CHECK rod ends for freedom of rotation & excessive movement

4 - PITOT TUBES		
1	Static & Dynamic Source	Remove cup, CHECK for blockage.

5 - RIGHT WING		
1	Wing Tie-down	DISCONNECT.
2	Main Wheel & Tyre	CHECK for security. Proper tyre inflation & wear or damage.
3	Wing Root Mount Bolts	CHECK for security.

6 - NOSE		
1	Propeller & Spinner	CHECK for nicks & security
2	Cowling	REMOVE & CHECK security of engine components & systems, particularly mounts, spark plugs, wiring,fuel lines, baffles CHECK for oil leaks
3	Engine Oil & Cooling liquid Level	CHECK & top up if necessary. Clean up any spilt oil.
4	Cowling	REPLACE & CHECK clips fastened & secure
5	Front Wheel	CHECK for proper inflation or damage.

7 - LEFT WING		
1	Main Wheel & Tyre	CHECK for security. Proper tyre inflation or damage.
2	Wing Root Mount Bolts	CHECK for security
3	Wing Tie-down	DISCONNECT

8 - LEFT WING - TRAILING EDGE		
1	Aileron	CHECK freedom of movement & security

2	Flap	CHECK security.
3	Control Rods & Cables	CHECK aileron & flap control bolts & nuts & flap control rod for security. CHECK rod ends for freedom of rotation & excessive movement

9 - CABIN		
1	Flight manual	AVAILABLE IN THE AIRCRAFT.
2	Control lock.	REMOVE Seatbelt Fastening
3	Ignition Switches	OFF
4	Master Switch	OFF
5	Fuel Shutoff Valve	ON
6	Seatbelts and Shoulder Harnesses	CHECK condition and security
7	Aileron Cable Mountings & Rod Ends	CHECK for free rotation & excessive movement, bolts secure & anchors.
8	Elevator Cable Mounting & Rod End	CHECK for free rotation & excessive movement, bolt secure & anchor on Main Beam secure.
9	Rudder & Nose Wheel Steering Push Rods & Rod Ends	CHECK for security & free movement
10	Flap Control	CHECK free movement & bolts secure.
11	Throttle & Carburettor Heat Controls	CHECK for full & free travel.
12	Brake Lever	CHECK for free travel & pressure.

4.3.2. BEFORE STARTING ENGINE

1	Preflight Inspection	COMPLETE
2	Seatbelts & Harness	ADJUST & LOCK
3	Fuel Shutoff Valve	ON
4	Radio/Intercom	OFF
5	Brakes	TEST & SET

4.3.3. STARTING ENGINE - COLD ENGINE.

1	Carburettor Heat	COLD
2	Choke	ON
3	Throttle	CLOSED
4	Fuel Boost Pump	ON
5	Propeller Area	CLEAR
6	Master Switch	ON
7	Ignition Switches	ON
8	Start Button	PRESS
9	Note: If the engine is cranking below 600 RPM, it will not start	
	As soon as engine is running, throttle back to an idle speed of 1000 - 1400 RPM	
10	Check all engine instruments for function	
11	Choke	CLOSED

IMPORTANT. Check the engine oil pressure.
If you do not see oil pressure within 10 seconds, shut down the engine immediately and determine the cause.

4.3.4. STARTING ENGINE - HOT ENGINE.

Proceed as for cold engine above, but eliminate the priming operation 3. Instead, open throttle to 1/4.

4.3.5. WARM-UP and FUNCTIONAL CHECK

Warm-up the engine with a fast idle of 1500 - 2500 RPM until the oil temperature reaches 50 degrees C. During this phase, the cooling is insufficient due to reduced airflow. It is therefore advisable not to shorten the warm-up time by running the engine at higher RPM. The aircraft should be pointed into wind to allow additional cooling air. As soon as the oil reaches 50° C, it is possible to do the run-up.

4.3.6. BEFORE TAKEOFF

1	Brakes	CHECK
2	Cabin Doors	CLOSED & LATCHED
3	Flight Controls	FREE & CORRECT
4	Flight Instruments	SET
5	Fuel Shutoff Valve	ON
6	Elevator Trim	NEUTRAL
7	Flaps	SET FOR TAKEOFF
8	Ignition Check	Throttle to 4000 RPM Hold this engine speed for 10 seconds. Switch OFF No. 1 Ignition and watch for RPM drop. Switch ON the No. 1 Ignition & switch OFF the No. 2 Ignition watching for the RPM drop. RPM drop should not exceed 200 RPM on

		either system. If drop is excessive, shut down & determine the reason. Switch No. 2 Ignition ON.
	NOTE During the check with one system only, the inactive sparkplugs may tend to load up slightly. To clean plugs, run the engine with both ignitions for a few seconds, then recheck the second system.	
9	Power Check	Throttle to 550 RPM Open the throttle fully & slowly to check the maximum RPM being produced. Wind conditions may effect, but as an average 5500 RPM should be seen.
	NOTE If the RPM is found to be more than 300 RPM lower than normal, the engine should be examined to determine the reason.	
10	Idle Check	Throttle to idle position & check that the engine runs smoothly. With too low an idle speed, or rough running, the cause must be located & corrected to avoid the potential for an in-flight stoppage
11	Carburettor Heat Check (if applicable)	Throttle up to 4000 RPM Pull out the Carburettor Heat Control & look for an RPM drop. Return the Carburettor Heat Control to the Full IN or cold position.

4.3.7. TAKEOFF

Normal Takeoff		
1	Wing Flaps	1st Stage
2	Carburettor Heat	COLD
3	Throttle	FULL.....OPEN
4	Elevator Control	LIFT NOSE WHEEL AT 45-55 Km/h and wait for aircraft to fly itself off (at around 75 Km/h)
5	Climb Speed	100 Km/h until Flaps retracted, then 110 Km/h.
6	At top of Climb, Fuel Boost Pump	OFF

Short Field Takeoff		
1	Wing Flaps	1st Stage
2	Carburettor Heat	COLD
3	Brakes	APPLY
4	Throttle	FULL OPEN
5	Brakes	RELEASE
6	Elevator Control	SLIGHTLY TAIL LOW
7	Climb Speed	100 Km/h (until all obstacles are cleared).
8	Wing Flaps	RETRACT slowly increasing speed to 110 Km/h

4.3.8. ENROUTE CLIMB

1	Airspeed	100 Km/h
2	Throttle	FULL OPEN
	NOTE : During climb, monitor the water & oil temperatures to avoid exceeding their limits. The aircraft has been tested to ensure adequate cooling in climb, therefore any excessive readings may indicate a malfunction. Should this occur, decrease the rate of climb in order to increase the airspeed for improved cooling.	

4.3.9. CRUISE

1	Power	Not above maximum continuous power of 5500 RPM. 5000-5400 Normal.
2	Elevator Trim	ADJUST.

4.3.10. BEFORE LANDING

1	Seatbelts & Harnesses	ADJUST & LOCK
2	Carburettor Heat	as required
3	Fuel Boost Pump	ON

4.3.11. LANDING

Normal Landing		
1	Airspeed	100 Km/h
2	Wing Flaps	FULL DOWN (below 100 Km/h)
3	Touchdown	MAIN WHEELS FIRST
4	Landing Roll	LOWER NOSE WHEEL GENTLY
5	Braking	MINIMUM REQUIRED

Short Field Landing		
1	Airspeed	90 Km/h
2	Wing Flaps	FULL DOWN (below 100 Km/h)
3	Power	REDUCE to idle as obstacle is cleared
4	Touchdown	MAIN WHEELS FIRST
5	Brakes	APPLY AS REQUIRED
6	Wing Flaps	RETRACT when convenient for better braking

Baulked Landing		
1	Throttle	FULL OPEN
2	Carburettor Heat	COLD
3	Wing Flaps	RETRACT to 1-2 DOWN
4	Airspeed	90 Km/h until clear of obstacles
5	Wing Flaps	RETRACT TO 1st STAGE until clear of obstacles then retract fully and continue to climb at or above 110 Km/h

4.3.12. AFTER LANDING

1	Wing Flaps	UP
2	Fuel Boost Pump	OFF
3	Carburettor Heat	Full IN or Cold

4.3.13. SECURING AIRPLANE

1	Radio/Intercom	OFF
2	Ignition Switches	OFF
3	Master Switch	OFF
4	Controls	LOCK with seatbelt
5	Fuel	OFF

4.4. OTHER PROCEDURES

4.4.1. FUELING

SAFETY WARNINGS

> Never prepare fuel in an area that is enclosed or where fumes could reach ignition point. DO NOT SMOKE or allow open flames or sparks in the vicinity. Never add fuel while the engine is running.

> Never refuel an aircraft if fuel could be spilled on hot engine components.

> Use only approved fuel containers and never transport fuel in an unsafe manner.

> Always check for fuel contamination. Contamination is a major cause of engine failure. The best place to avoid contamination is at the source. Once your fuel is in the container a very hazardous potential exists. Use a clean safety approved storage container. Do not overfill the container - allow for expansion.

> The engine is designed for use with unleaded MOGAS, which has an Octane Rating of 90 RON of higher. Use aviation gasoline only for short period time and with carbon level inspection. Be sure to use products of at least the standard shown in Section 1.

> Always earth the aircraft through the Earthing Point provided at the fuel filler before removing the fuel cap.

> Before first flight of the day, and after each refueling, use a sampler cup and drain a small quantity of fuel from the fuel tank sump quick drain valve -check for water, sediment and contamination.

FUEL SYSTEM WATER DRAINAGE

Where there is a suspicion that water may be present in the fuel tank, the following procedure is to be followed.

> Lower the empennage of the aircraft to near the ground and rock the aircraft up and down and side to side at the same time. Repeat up to 10(ten) times.

> Check fuel tank sump by sampling fuel.

> If water is present, repeat the entire procedure until you are certain that no water remains in the tank or fuel system.

- Where doubt still exists the aircraft fuel system should be examined by a qualified person and fully stripped and drained before flight.

FILLING THE TANK

When fueling from a pump to a full tank condition lift the nozzle out slightly for the last four liters and slow the speed down as you can create a siphon motion that will dump the last four liters out until the vent is above the fuel level. If this happens quickly replace the fuel cap to break the siphon.

4.4.2. TAXIING

When taxiing, it is important that speed and use of brakes be kept to a minimum and that all controls be utilized to maintain directional control and balance.
The carburetor heat control knob should be pushed full IN (that is, NOT selected) during all ground operations unless heat is absolutely necessary. Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller.

DO NOT accelerate over loose gravel or cinders or propeller damage will result.

4.4.3. PROPELLER CARE

Full throttle run up over loose gravel is especially harmful to propeller tips. When takeoffs must be made over a gravel surface, it is very important that the throttle is advanced slowly. This allows the airplane to start rolling before high RPM is developed, and the gravel will be blown behind the propeller rather than pulled into it. When unavoidable small nicks appear in the propeller, they should be immediately corrected.

4.4.4. CROSSWIND TAKEOFF

Take off into strong crosswinds are normally performed with the minimum flap setting necessary for the field length, to minimize the drift angle immediately after takeoff. With the ailerons partially deflected into the wind, the airplane is accelerated to a speed slightly higher than normal, and then pulled off positively and smoothly to prevent possible settling back to the runway while drifting. When clear of the ground, make a coordinated turn into the wind to correct for drift.

4.4.5. CRUISE

Normal cruising is performed between 75 % and 90 % power. Continuous cruise should not be above 27500 RPM.
Flights should be planned at 20 liters per hour with 45 minutes reserve, with appropriate allowances for wind conditions which will assist in determining the most favourable altitude and power setting for a given trip.

4.4.6. CROSSWIND LANDING

The limiting crosswind velocity of 25 Km/h has been demonstrated at FULL Flap. However, in strong crosswind conditions use the minimum flap consistent with the strip length available.
Use the Wing Low technique right through to touchdown and land on Mains first.

4.4.7. BAULKED LANDING

In a baulked landing (go-around) climb, the wing flap setting should be reduced to the First Stage and landing gears retracted, immediately after full power is applied and the aircraft has accelerated to a safe climb speed. Upon reaching a safe airspeed, the flaps should be slowly retracted to the full up position, whilst allowing the aircraft to accelerate to the best climb speed.

4.4.8. NOISE ABATEMENT

Increased emphasis on improving the quality of our environment requires renewed effort on the part of all pilots to minimize the effect of airplane noise on the public.

As pilots, we can demonstrate our concern for environmental improvement by application of the following procedures:

1	At altitudes under 600 meters, avoid flying in close proximity to houses or over parks and recreational areas
2	During approach to or departure from an airport, climb after takeoff and descent for landing should be made so as to avoid prolonged flight at low altitude near noise sensitive areas.

4.4.9. VISIBLE MOISTURE

Where flights are likely to include operations in visible moisture or rain, the use of window treatment is recommended.

4.4.10. STOPPING THE ENGINE

To stop the engine, turn OFF the ignition switches and turn OFF the Master Switch. Carburettor Heat should be returned to the Full IN or cold position.

4.4.11. STARTING THE ENGINE FROM EXTERNAL POWER SOURCE

Where it is necessary to start the engine from an external power source:

		Remove Top cowl
		Place jumper leads directly on battery terminals, ensuring positive to positive and negative to negative
		Start as for normal operation
		Stop engine, remove jumper leads,refit cowl
	W A R N I N G Wheels must be chocked. Ensure propeller is clear. Ensure qualified person is in the operator seat. Do not attempt to refit cowl with propeller running.	

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Section 5 - Performance

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5.1. STALLING

5.1.1. STALL SPEEDS

(In Km/h and power off condition – Maximum Takeoff & Landing Weight)

Flap Setting	Zero	Stage 1 Takeoff	Stage 2 Landing
Vs	80	70	60

5.1.2. NATURE OF STALL

Aircraft buffeting announce the stall.

5.2. TAKEOFF & LANDING DISTANCES

Takeoff safety speed is 1.3 Vsi	95 Km/h
Landing Approach speed (Full Flap)	100 Km/h

The sea-level takeoff distance to 15 m at 0 wind or slope, on a short dry grass surface, is 250 meters. The sea-level take-off strip length exceeds the landing strip length.

Takeoff and Landing Distance is therefore 250 meters
times 1.4 = 350 meters.
This distance is established using the normal technique described in paragraph 4.3.7.

This distance must be increased by a distance increment of 110 metres for each one thousand feet (305 meters) of pressure altitude.

5.3. MAXIMUM CROSSWIND FOR TAKEOFF & LANDING

25 Km/h

Section 6 - Weight and Balance

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6.1. Introduction

This section contains basic weight and center of gravity information necessary to ensure correct loading. It records the weight and balance of the empty aircraft, together with the Aircraft Weight & Balance diagram.

These documents are to be carried in the Flight Manual at all times.

6.2. Aircraft Weight Record

Registration No.	
Aircraft Model	Pioneer 200
Serial Number	
Issue	
Date	
Expiry Date	

Aircraft	Empty
Weight kg	
Arm mm aft of datum	

Note: Empty aircraft includes Full Engine oil, unusable fuel 0.5 kg

Weight Control Manager Signature :.....

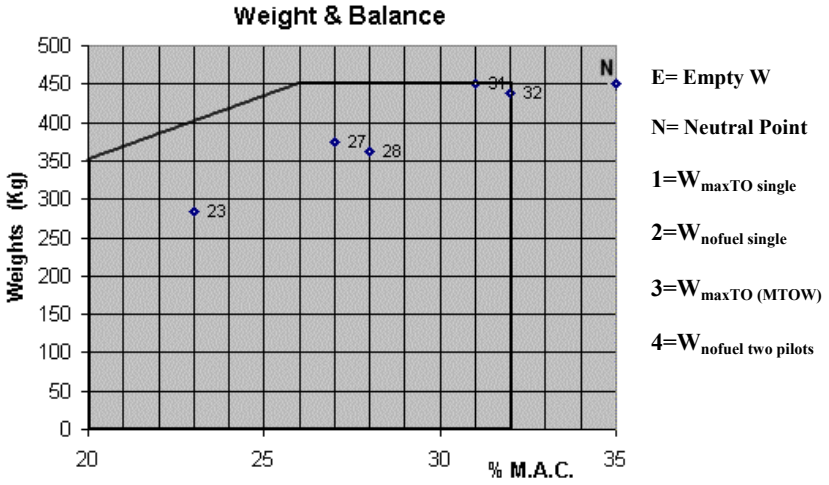
Date.....

Maximum takeoff and landing weight 450 Kg)

6.3. Center of Gravity Limits

6.3.1. Operational Aircraft Center of Gravity

Forward Limit:	20% MAC = 670 mm aft of datum up to & including 350 kg 26% MAC = 685 mm aft of datum @ 450 Kg. Variation is linear between 350 and 450 Kg
Aft Limit	32% MAC = 768 mm aft of datum at all weights
Datum	Fire-guard bulked.
MAC L.E. station	320 mm aft of datum (M.A.C. = 1400 mm)
Leveling Means :	
Longitudinal	Spirit Level placed lateral canopy strut
Lateral	Spirit Level crossing canopy
Crew Station	1000 mm aft of datum
Fuel Station	200 mm aft of datum
Baggage Station	1200 mm aft of datum



6.4. Aircraft Equipment List

Items listed in the following table were fitted to the standard aircraft at manufacture and were included in the aircraft basic weight.

Generic Item	Specific Item
Engine	Rotax 912 UL
Propeller	Tonini wooden fix
Flight Instruments	
Airspeed Indicator	X
Altimeter	X
Slip/Skid	X
Compass	X
Vertical Speed Indicator	X
Engine Instruments	
Tachometer	X
Oil Pressure Gauge	X
Oil Temperature Gauge	X
Cylinder Head Temperature Gauge	X
Hour-meter	X
Communications Equipment	
VHF Transceiver	X
Headsets x 2	X
Intercom	X
Headphones	X
Miscellaneous Equipment	
Seat Cushions	X
Door Map Pockets	X
Sound Curtain	
Seat Belts	X
Electrical Storage Battery	X